

Project name

Shell and Core

Stag Brewery-Building 1-Office-Lean

As designed

Date: Thu Jan 20 20:54:17 2022

Administrative information

Building Details

Address: Address 1, City, Postcode

Owner Details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.12

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.12

BRUKL compliance check version: v5.6.a.1

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	18.9
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	18.9
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	18.8
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.18	0.18	0000014:Surf[1]
Floor	0.25	0.2	0.2	01000013:Surf[0]
Roof	0.25	0.15	0.15	02000011:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.4	1.4	00000016:Surf[0]
Personnel doors	2.2	1.1	1.1	00000014:Surf[0]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* There might be more than one surface where the maximum U-value occurs.				
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.				
*** Display windows and similar glazing are excluded from the U-value check.				
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	5

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- Heating only

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	0	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- VRF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	5.5	0	1.6	0.75
Standard value	0.91*	3.2	N/A	1.6^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

1- DWH

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.91	-
Standard value	0.8	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

Zone name	SFP [W/(l/s)]										HR efficiency	
	A	B	C	D	E	F	G	H	I	Zone	Standard	
ID of system type												
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1			
00-Office-Staff Office	-	-	-	-	-	-	-	0.4	-	-	N/A	
00-Office-Dis WC	-	-	0.4	-	-	-	-	-	-	-	N/A	
00-Office-Corridor	-	-	-	-	-	-	-	0.4	-	-	N/A	
00-Office-Lift Lobby	-	-	-	-	-	-	-	0.4	-	-	N/A	
00-Office-Reception	-	-	-	-	-	-	-	0.4	-	-	N/A	
01-Office-Circulation	-	-	-	-	-	-	-	0.4	-	-	N/A	

Zone name	SFP [W/(l/s)]									HR efficiency		
	ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1			
01-Office-Dis WC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
01-Office-WC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
01-Office-WC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
01-Office-Open Plan Office SW	-	-	-	-	-	-	-	0.4	-	-	-	N/A
01-Office-Open Plan Office SE	-	-	-	-	-	-	-	0.4	-	-	-	N/A
01-Office-Open Plan Office NE	-	-	-	-	-	-	-	0.4	-	-	-	N/A
01-Office-Open Plan Office NW	-	-	-	-	-	-	-	0.4	-	-	-	N/A
02-Office-Corridor	-	-	-	-	-	-	-	0.4	-	-	-	N/A
02-Office-DisWC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
02-Office-WC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
02-Office-WC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
02-Office-Open Plan Office SE	-	-	-	-	-	-	-	0.4	-	-	-	N/A
02-Office-Open Plan Office NE	-	-	-	-	-	-	-	0.4	-	-	-	N/A
02-Office-Open Plan Office NW	-	-	-	-	-	-	-	0.4	-	-	-	N/A
02-Office-Open Plan Office SW	-	-	-	-	-	-	-	0.4	-	-	-	N/A
02-Office-Tea point	-	-	-	-	-	-	-	0.4	-	-	-	N/A
03-Office-Corridor	-	-	-	-	-	-	-	0.4	-	-	-	N/A
03-Office-DisWC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
03-Office-WC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
03-Office-WC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
03-Office-Tea point	-	-	-	-	-	-	-	0.4	-	-	-	N/A
03-Office-Meeting Room	-	-	-	-	-	-	-	0.4	-	-	-	N/A
03-Office-Meeting Room	-	-	-	-	-	-	-	0.4	-	-	-	N/A
03-Office-Meeting Room	-	-	-	-	-	-	-	0.4	-	-	-	N/A
03-Office-Open Plan Office	-	-	-	-	-	-	-	0.4	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
00-Office-Stiarwell	NO
00-Office-Refuse Store	NO
00-Office-Boiler Room	NO
00-Office-Staff Office	NO
00-Office-Dis WC	NO
00-Office-Corridor	NO
00-Office-Lift Lobby	NO
00-Office-Reception	NO
01-Office-Stairwell	NO
01-Office-Circulation	NO
01-Office-Stairwell	NO
01-Office-Dis WC	NO
01-Office-Store	NO
01-Office-WC	NO
01-Office-WC	NO
01-Office-Open Plan Office SW	NO
01-Office-Open Plan Office SE	NO

Shell and core configuration

Zone	Assumed shell?
01-Office-Open Plan Office NE	NO
01-Office-Open Plan Office NW	NO
02-Office-Stairwell	NO
02-Office-Corridor	NO
02-Office-Stairwell	NO
02-Office-DisWC	NO
02-Office-Store	NO
02-Office-WC	NO
02-Office-WC	NO
02-Office-Open Plan Office SE	NO
02-Office-Open Plan Office NE	NO
02-Office-Open Plan Office NW	NO
02-Office-Open Plan Office SW	NO
02-Office-Tea point	NO
03-Office-Stairwell	NO
03-Office-Corridor	NO
03-Office-Stairwell	NO
03-Office-DisWC	NO
03-Office-Store	NO
03-Office-WC	NO
03-Office-WC	NO
03-Office-Tea point	NO
03-Office-Meeting Room	NO
03-Office-Meeting Room	NO
03-Office-Meeting Room	NO
03-Office-Open Plan Office	NO
RF-Office-Plant	NO

General lighting and display lighting Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Standard value	60	60	22	
00-Office-Stairwell	-	80	-	72
00-Office-Refuse Store	80	-	-	62
00-Office-Boiler Room	80	-	-	169
00-Office-Staff Office	80	-	-	348
00-Office-Dis WC	-	80	-	62
00-Office-Corridor	-	80	-	103
00-Office-Lift Lobby	-	80	-	69
00-Office-Reception	-	80	60	500
01-Office-Stairwell	-	80	-	59
01-Office-Circulation	-	80	-	273
01-Office-Stairwell	-	80	-	63
01-Office-Dis WC	-	80	-	64
01-Office-Store	80	-	-	18
01-Office-WC	-	80	-	123

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
		60	60	22	
01-Office-WC		-	80	-	125
01-Office-Open Plan Office SW		80	-	-	1432
01-Office-Open Plan Office SE		80	-	-	862
01-Office-Open Plan Office NE		80	-	-	1235
01-Office-Open Plan Office NW		80	-	-	1259
02-Office-Stairwell		-	80	-	59
02-Office-Corridor		-	80	-	248
02-Office-Stairwell		-	80	-	63
02-Office-DisWC		-	80	-	64
02-Office-Store		80	-	-	18
02-Office-WC		-	80	-	123
02-Office-WC		-	80	-	125
02-Office-Open Plan Office SE		80	-	-	1432
02-Office-Open Plan Office NE		80	-	-	862
02-Office-Open Plan Office NW		80	-	-	1235
02-Office-Open Plan Office SW		80	-	-	1259
02-Office-Tea point		80	-	-	117
03-Office-Stairwell		-	80	-	54
03-Office-Corridor		-	80	-	226
03-Office-Stairwell		-	80	-	58
03-Office-DisWC		-	80	-	55
03-Office-Store		80	-	-	15
03-Office-WC		-	80	-	114
03-Office-WC		-	80	-	116
03-Office-Tea point		80	-	-	115
03-Office-Meeting Room		80	-	-	428
03-Office-Meeting Room		80	-	-	238
03-Office-Meeting Room		80	-	-	197
03-Office-Open Plan Office		80	-	-	1962
RF-Office-Plant		80	-	-	1442

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00-Office-Staff Office	NO (-44%)	NO
00-Office-Corridor	N/A	N/A
00-Office-Lift Lobby	NO (-81.9%)	NO
00-Office-Reception	NO (-33.7%)	NO
01-Office-Circulation	N/A	N/A
01-Office-Open Plan Office SW	NO (-4.7%)	NO
01-Office-Open Plan Office SE	YES (+31.4%)	NO
01-Office-Open Plan Office NE	NO (-2.4%)	NO
01-Office-Open Plan Office NW	NO (-30%)	NO
02-Office-Corridor	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
02-Office-Open Plan Office SE	NO (-4.6%)	NO
02-Office-Open Plan Office NE	YES (+31.4%)	NO
02-Office-Open Plan Office NW	NO (-2.4%)	NO
02-Office-Open Plan Office SW	NO (-29.9%)	NO
02-Office-Tea point	N/A	N/A
03-Office-Corridor	N/A	N/A
03-Office-Tea point	N/A	N/A
03-Office-Meeting Room	YES (+46.4%)	NO
03-Office-Meeting Room	YES (+86.9%)	NO
03-Office-Meeting Room	YES (+83.4%)	NO
03-Office-Open Plan Office	YES (+64.4%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	2850.7	2850.7
External area [m ²]	2826.9	2826.9
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	3
Average conductance [W/K]	1599.94	1429.94
Average U-value [W/m ² K]	0.57	0.51
Alpha value* [%]	10	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area Building Type

	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
100	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	8.26	4.63
Cooling	8.4	8.29
Auxiliary	17.11	10.1
Lighting	7.3	16.29
Hot water	1.84	1.84
Equipment*	57.87	57.87
TOTAL**	42.91	41.14

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	143.1	127.43
Primary energy* [kWh/m ²]	110.55	111.68
Total emissions [kg/m ²]	18.8	18.9

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance

System Type	Heat dem MJ/m ²	Cool dem MJ/m ²	Heat con kWh/m ²	Cool con kWh/m ²	Aux con kWh/m ²	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	32	165.6	10.9	11.7	23.5	0.82	3.92	0.91	5
	Notional	18.9	157.7	6.1	11.6	13.8	0.86	3.79	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	13.2	0	4.3	0	2.6	0.85	0	0.91	0
	Notional	7.6	0	2.4	0	1.9	0.86	0	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m ²]	= Heating energy demand
Cool dem [MJ/m ²]	= Cooling energy demand
Heat con [kWh/m ²]	= Heating energy consumption
Cool con [kWh/m ²]	= Cooling energy consumption
Aux con [kWh/m ²]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.18	00000014:Surf[1]
Floor	0.2	0.2	01000013:Surf[0]
Roof	0.15	0.15	02000011:Surf[0]
Windows, roof windows, and rooflights	1.5	1.4	00000016:Surf[0]
Personnel doors	1.5	1.1	00000014:Surf[0]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	5